

S/N 10/692,298



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Date of Deposit:

5/28/2008

By:

Bahram Mechanic

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF
Bahram Mechanic

DOCKET NO.: 043481.000004

SERIAL NO.: 10/692,298

EXAMINER: Luis E. Roman

FILED: 10/23/2003

GROUP ART UNIT: 2836

TITLE: SURGE SUPPRESSION APPARATUS INCLUDING AN LC NEUTRAL-
GROUND FILTER

DECLARATION OF BAHRAM MECHANIC

I, Bahram Mechanic, declare and say that:

1. My name is Bahram Mechanic and I reside at 5110 San Felipe, Houston, Texas. I hold a Masters of Science from the University of Tehran granted in Iran. Since 1972, I have been employed as the President of Smart Power Systems.
2. I am an inventor in the present application and have carefully studied the Office Actions mailed with regard to this application. I am familiar with the rejections in the Office Actions and the patents cited in the actions.
3. The Copier Guardian TBF15C-1121TN is a product of Smart Power Systems. A true and correct copy of the schematic diagram of the Smart Power Systems Copier Guardian TBF15C-1121TN product is attached as Exhibit A. The schematic of the Smart Power Systems Copier Guardian TBF15C-1121TN product in all material

aspects substantially the same as the schematics of the embodiments of the present application illustrated in Figs. 1A to 3 of the present application. Furthermore, note that the Smart Power Systems Copier Guardian TBF15C-1121TN product includes an inductor X4 in the ground connection and a capacitor C4 connected between neutral and ground just as provided in all of the embodiments of the invention in the present application illustrated in Figs. 1A to 3 of the present application. In other words, the Smart Power Systems Copier Guardian TBF15C-1121TN product provides an L-C filter between neutral and ground just as that provided in all of the embodiments of the invention included in the present application.

4. A true and correct copy of a testing report entitled: Electronic Power Conditioner & TVSS/Filter Testing Report, dated 16 March 2005, prepared for Smart Power Systems by Thomas J. Shaughnessy, Vice President of PowerCET Corporation, is attached as Exhibit B.

5. PowerCET Corporation is an independent consulting firm specializing in power quality and electromagnetic environment conditions. PowerCET is not affiliated with any manufacturers of power conditioning equipment nor does PowerCET represent or resell power protection and mitigation equipment. Throughout the 20 year history of PowerCET, PowerCET has worked with manufacturers of power protection equipment by providing independent product evaluation.

6. As described in Electronic Power Conditioner & TVSS/Filter Testing Report at Page 1, Smart Power Systems retained PowerCET Corporation to test and verify the performance of Smart Power System's TBF Copier Guardian electronic power conditioner and several other filter and TVSS products. Tests performed on the

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products included: a) surge voltage testing; b) momentary over-voltages; and c) wiring problems.

7. As described in Electronic Power Conditioner & TVSS/Filter Testing Report, the products included in the testing were:

<u>Product</u>
Smart Power Systems Copier Guardian model TBF15C-1121TN
EFI TVSS model DPF12015NR
Panamax ImagePro 15 Amp
ESP Digital QC model D5130NT
Oneac Filter One

8. All of the competitor products tested, and as described, in Electronic Power Conditioner & TVSS/Filter Testing Report were manufactured prior to the filing date of the present application of 23-October-2003. In particular, a true and correct copy of photographs of the name plates for several of the actual competitor products tested in Electronic Power Conditioner & TVSS/Filter Testing Report is attached as Exhibit C. The manufacturing dates of the actual competitor products tested in Electronic Power Conditioner & TVSS/Filter Testing Report is summarized below:

<u>Competitor Product</u>	<u>Date of Manufacture</u>
EFI TVSS model DPF12015NR	27-August-2002
Panamax ImagePro 15 Amp	Believed to Be Prior to 23-October-2003
ESP Digital QC model D5130NT	March-2003

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<u>Competitor Product</u>	<u>Date of Manufacture</u>
Oneac Filter One	May-2003

9. As described in the Electronic Power Conditioner & TVSS/Filter Testing Report at Page 3, the results for the Surge Voltage Tests included the following:

Numeric test results

Table 1 - Synopsis of numeric test results.

6 kV Normal Mode (L/N applied test pulse & L/N measured differential voltage)			
	Volts Peak-to-Peak	Vmax	Vmin
Smart Power Copier Guardian	6	3.2	-2.8
EFI TVSS	94	37	-57
Panamax Max Image Pro	283	124	-159
ESP Digital QC	10.6	5.40	-5.20
Oneac FilterOne	14.6	8.60	-6.00
3 kV Common Mode (N/G applied test pulse & N/G measured differential voltage)			
Smart Power Copier Guardian	0.360	0.680	0.320
EFI TVSS	436	216	-220
Panamax Max Image Pro	10.9	8.80	-2.10
ESP Digital QC	12.9	13.4	0.50
Oneac FilterOne	9.16	6.36	-2.80

10. The results for the 3 kV Common Mode (N/G applied test pulse & N/G measured differential voltage) portion of the Surge Voltage Tests illustrated immediately above and described in Electronic Power Conditioner & TVSS/Filter Testing Report at Page 3, may be summarized as follows:

<u>Product</u>	<u>Pass-Through Voltage</u> <u>Peak-To-Peak</u>	<u>Percent Difference</u> <u>Versus The Smart</u> <u>Power Copier</u> <u>Guardian</u>
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<u>Product</u>	<u>Pass-Through Voltage</u> <u>Peak-To-Peak</u>	<u>Percent Difference</u> <u>Versus The Smart</u> <u>Power Copier</u> <u>Guardian</u>
Smart Power Systems Copier Guardian model TBF15C-1121TN	0.360 V	N/A
EFI TVSS model DPF12015NR	436 V	121,111 % Greater
Panamax ImagePro 15 Amp	10.9 V	3027 % Greater
ESP Digital QC model D5130NT	12.0 V	3333 % Greater
Oneac Filter One	9.16 V	2544 % Greater

11. The acceptable voltage for a neutral-ground spike in the industry is less than 0.5 volts. Thus, the Smart Power Systems Copier Guardian model TBF15C-1121TN was the only product tested in the 3 kV Common Mode (N/G applied test pulse & N/G measured differential voltage) portion of the Surge Voltage Tests in Electronic Power Conditioner & TVSS/Filter Testing Report that met the industry standard.

12. The circuit elements within the Smart Power Systems Copier Guardian model TBF15C-1121TN that provided the results illustrated above in paragraphs 9, 10 and 11 of the present declaration were provided through the use of the L-C filter between neutral and ground illustrated in the schematic for the Smart Power Systems Copier Guardian model TBF15C-1121TN, attached as Exhibit A, and described above in paragraph 3 of the present declaration.

12. The fact that the Smart Power Systems Copier Guardian model TBF15C-1121TN was the only product tested the 3 kV Common Mode (N/G applied test pulse & N/G measured differential voltage) portion of the Surge Voltage Tests in Electronic Power Conditioner & TVSS/Filter Testing Report that met the industry standard for a neutral-ground spike was an unexpected result.

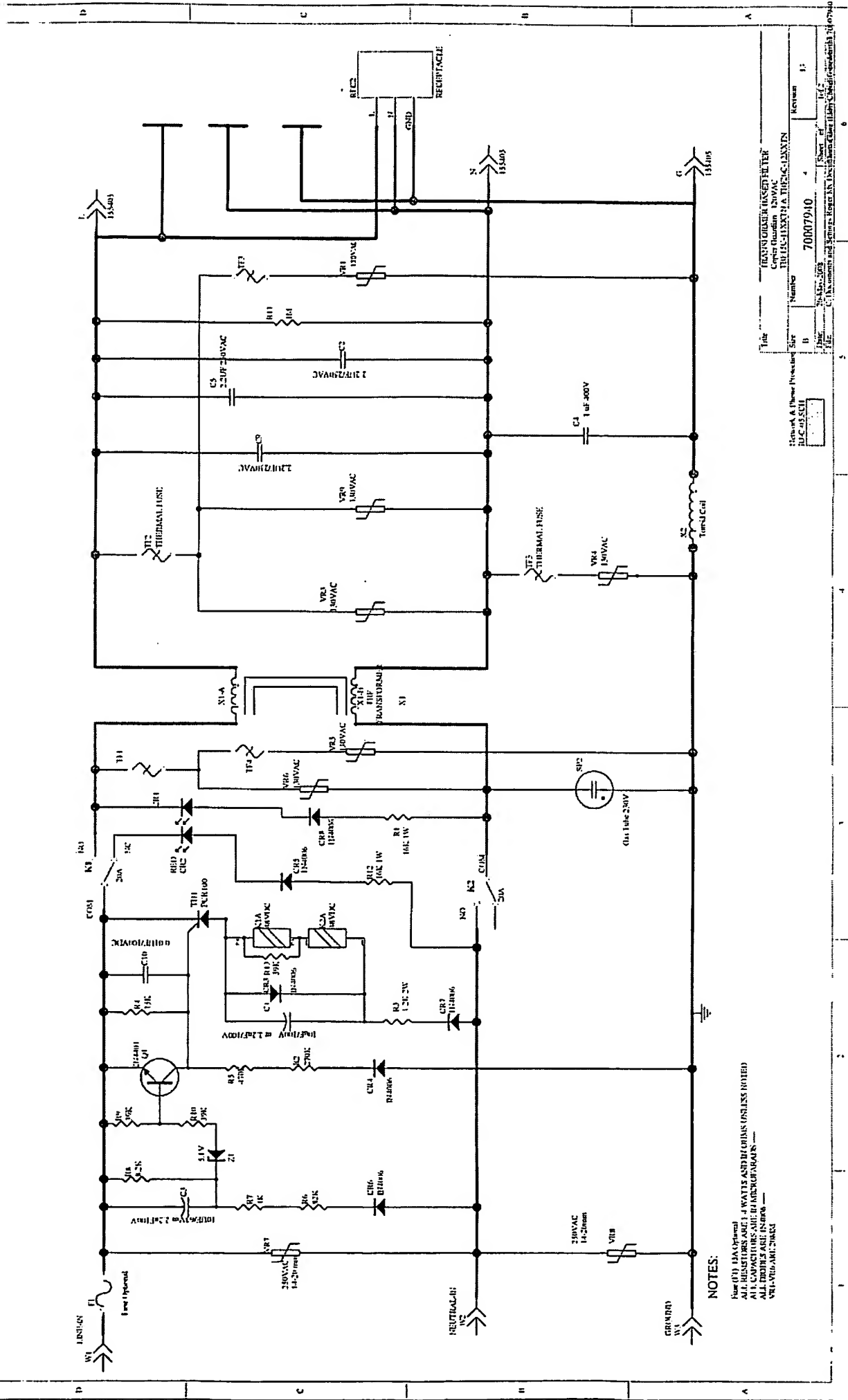
13. The fact that the Smart Power Systems Copier Guardian model TBF15C-1121TN was the only product tested the 3 kV Common Mode (N/G applied test pulse & N/G measured differential voltage) portion of the Surge Voltage Tests in Electronic Power Conditioner & TVSS/Filter Testing Report provided a peak-to-peak pass through voltage that was anywhere from 2544 to 121,111 % less than that for the competitor products tested was an unexpected result.

14. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the publication or any patent issued thereon.

FURTHER DECLARANT SAYETH NOT.

Executed on: 5/27/08

By: Bahram Mechanic
Bahram Mechanic



NOTES:

Power (11) 11A (Optimal)
 ALL RESISTORS ARE 1/4 WATT AND 5% TOLERANCE UNLESS NOTED
 ALL CAPACITORS ARE 5% TOLERANCE UNLESS NOTED
 ALL DIMENSIONS ARE IN INCHES
 VOLTAGE IS 250VAC

REPAIR ORDER INKED FILTER

Capacitor 120VAC

120VAC 120VAC 120VAC 120VAC

120VAC 120VAC 120VAC 120VAC

120VAC 120VAC 120VAC 120VAC

120VAC 120VAC 120VAC 120VAC

120VAC 120VAC 120VAC 120VAC

PowerCET Corporation
3350 Scott Blvd., Bldg. 55. Unit 1
Santa Clara, CA 95054 USA
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URL: <http://www.powercet.com>
E-mail: consulting@powercet.com



Electronic Power Conditioner & TVSS/Filter Testing Report

**Prepared for
Smart Power Systems**

**Prepared by
Thomas J. Shaughnessy
VP PowerCET Corporation
16 March 2005**

Electronic Power Conditioner & TVSS/Filter Testing

Background

Smart Power Systems retained PowerCET Corporation to test and verify the performance of their TBF Copier Guardian electronic power conditioner and of several other filter and TVSS products. Tests performed on the products included:

- Surge voltage testing with ANSI/IEEE C62.41-1991 waveforms – The surge voltages were generated with a KeyTek model 711 surge generator. Surge voltages were applied normal mode (L/N) and common mode (N/G). All test pulses were category A ringwaves (6kV L/N & 3kV N/G). This test verifies withstand and voltage let-through.
- Momentary over-voltages -- 150% over-voltages were generated with a Power Science line disturbance simulator. Three second over-voltage events were applied to the devices and the output voltages were recorded with a Dranetz 658 power monitor. The monitor simultaneously recorded the voltage at the input and output of various power protection devices.
- Wiring problems -- Open ground and line/neutral reversals were applied to the products. The output electrical conditions were visually checked with light bulbs and multimeters. The wiring problems reflect conditions that are commonly found in residential and commercial facilities:

Products included in the testing:

- Smart Power Ñ Digital Smart TBF Ñ Copier Guardian Ñ model TBF15C-1121TN
- EFI Ñ Transient Voltage Surge Suppressor (TVSS) Ñ model DPF12015NR
- Panamax Ñ MAX ImagePro 15 Amp
- ESP Ñ Digital QC Ñ model D5130NT
- Oneac Ñ - FilterOne

Synopsis of test results

- Surge Voltage Testing: The Smart Power Electronic Power Conditioner kept let-through voltages below 10 volts line/neutral and 0.5 volts neutral/ground. ESP and Oneac products kept let-through voltages below 20 volts. The Panamax product kept neutral/ground let-through below 20 volts, but both the EFI and Panamax products let-through much higher voltages line/neutral.
- Over-voltage Testing: The Smart Power and Panamax products removed output power when applied voltages exceeded preset limits and automatically reset when applied voltage returned to normal levels. The other products passed the over-voltage conditions through to their outputs.
- Wiring Faults: The Smart Power and Panamax products removed power from their outputs with open ground and with line/neutral reversals. The other products maintained output voltages.

Surge Voltage Tests

Background

Smart Power Systems electronic power conditioning products along with various filter and TVSS products were tested with standard ANSI/IEEE C62.41-1991 waveforms generated with a KeyTek model 711 surge generator. Surge voltages were applied normal mode (L/N) and common mode (N/G). All test pulses were category A ringwaves (6kV L/N & 3kV N/G).

Products included in the testing are:

- Smart Power Systems D Digital Smart TBF D Copier Guardian
- EFI D Transient Voltage Surge Suppressor (TVSS)
- Panamax D MAX ImagePro 15 Amp
- ESP D Digital QC
- Oneac D FilterOne

Differential let-through voltages were measured with a Tektronix digital storage oscilloscope. L/N measurements were performed with differential Tektronix scope probes and a high pass filter. The high pass filter was used solely to remove the 60 Hz waveform and passes signals above 10kHz. N/G tests were performed with differential 50 Ohm coaxial cables and low pass filter. The low pass filter passes signals up to 4MHz. The EFI N/G measurements did not use a low pass filter for N/G because the voltage differentials exceeded the range of the digital storage oscilloscope. Tektronix 10x probes were used without any filters to measure the N/G differential voltage of the EFI device.

Numeric test results

Table 1 - Synopsis of numeric test results.

6 kV Normal Mode (L/N applied test pulse & L/N measured differential voltage)			
	Volts Peak-to-Peak	Vmax	Vmin
Smart Power Copier Guardian	6	3.2	-2.8
EFI TVSS	94	37	-57
Panamax Max Image Pro	283	124	-159
ESP Digital QC	10.6	5.40	-5.20
Oneac FilterOne	14.6	8.60	-6.00
3 kV Common Mode (N/G applied test pulse & N/G measured differential voltage)			
Smart Power Copier Guardian	0.360	0.680	0.320
EFI TVSS	436	216	-220
Panamax Max Image Pro	10.9	8.80	-2.10
ESP Digital QC	12.9	13.4	0.50
Oneac FilterOne	9.16	6.36	-2.80

Smart Power – Digital Smart TBF – Copier Guardian



Photo 1 – Smart Power Digital Smart TBF—Copier Guardian.

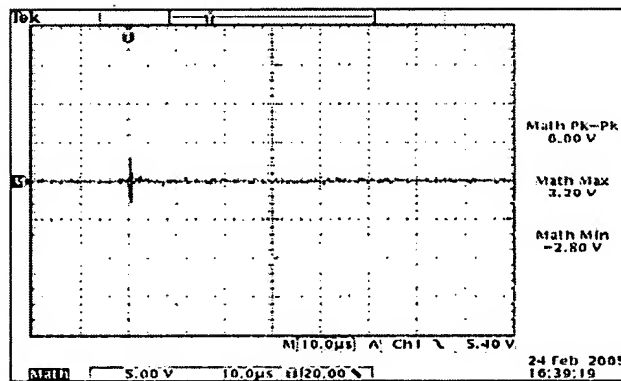


Figure 1: Smart Power Copier Guardian
Line/Neutral Let-through

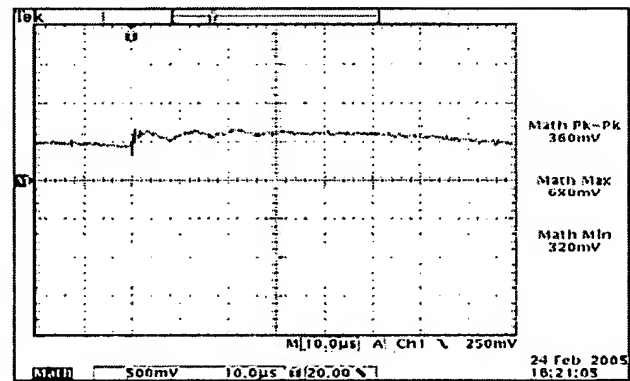


Figure 2: Smart Power Copier Guardian
Neutral/Ground Let-through

EFI – Transient Voltage Surge Suppressor



Photo 2 – EFI Transient Voltage Surge Suppressor.

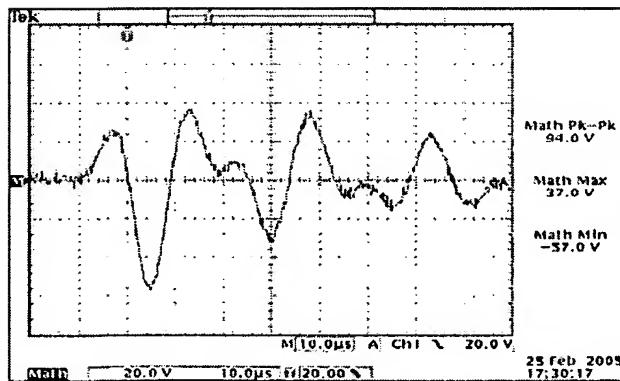


Figure 3: EFI TVSS Isolated output
Line/Neutral Let-through

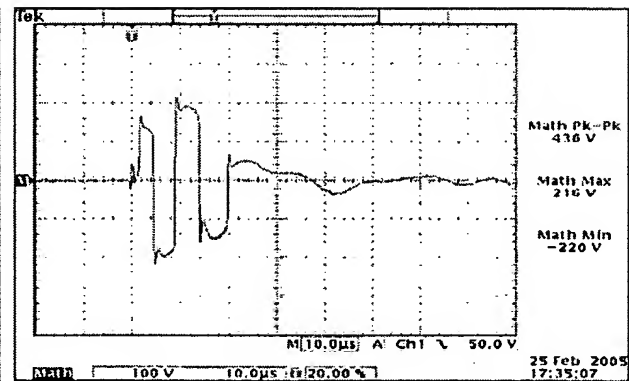


Figure 4: EFI TVSS Isolated output
Neutral/Ground Let-through

Panamax – MAX ImagePRO 15-Amp

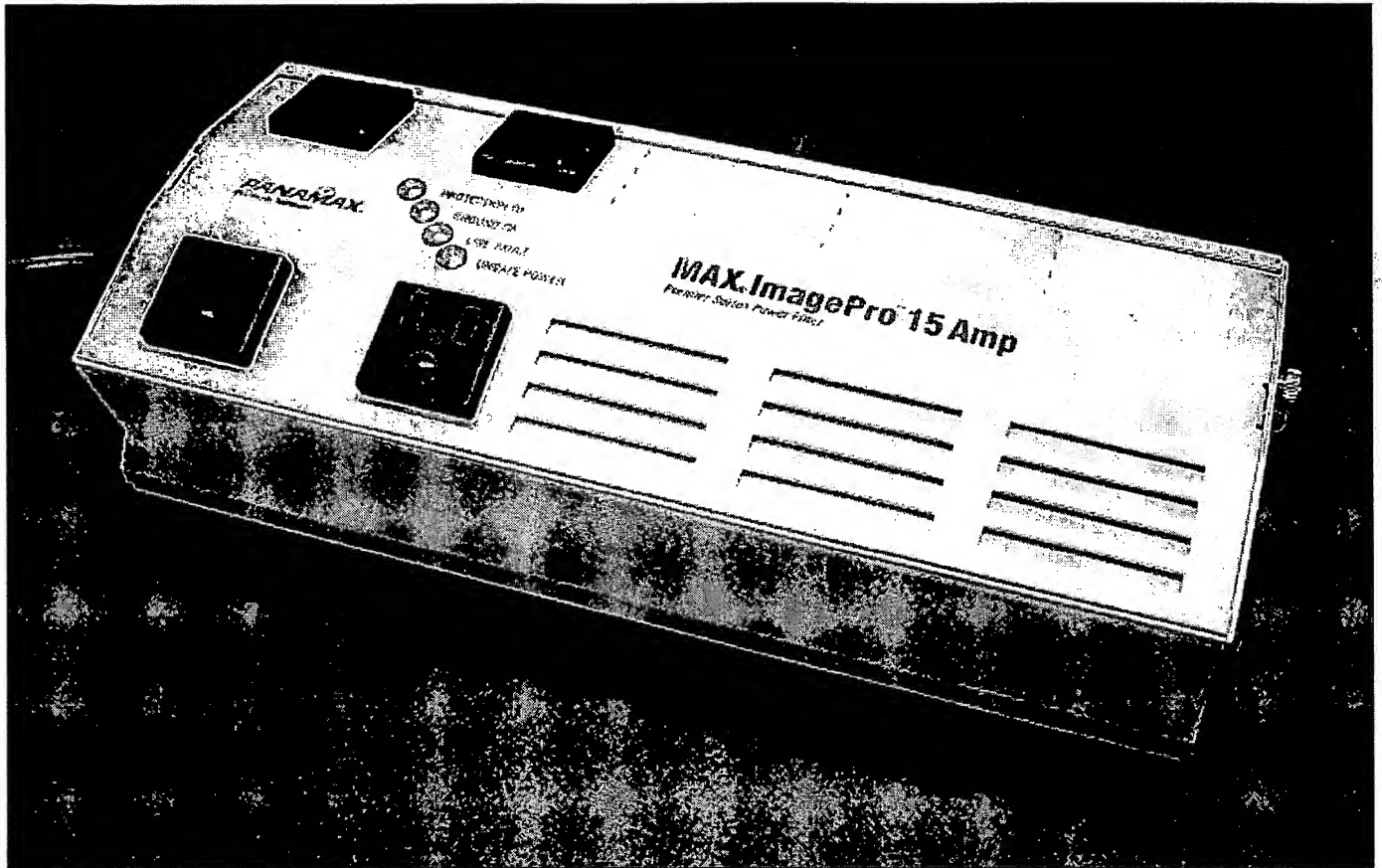


Photo 3 – Panamax MAX ImagePRO 15-Amp.

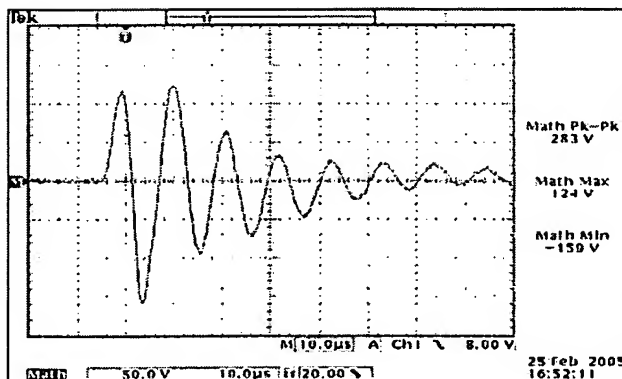


Figure 5: Panamax MAX Image Pro 15 Amp -
Line/Neutral Let-through

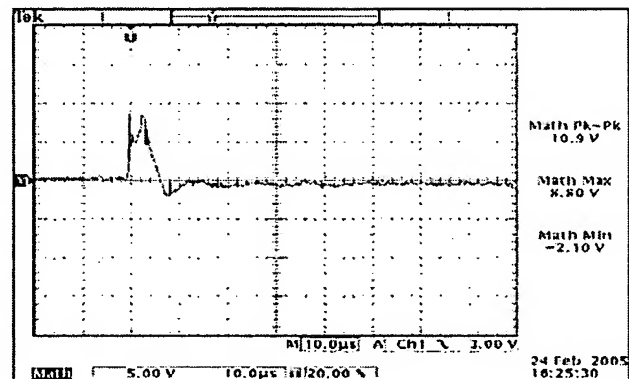


Figure 6: Panamax MAX Image Pro 15 Amp
Neutral/Ground Let-through

Electronic System Protection — Digital QC



Photo 4 – Electronic System Protection Digital QC.

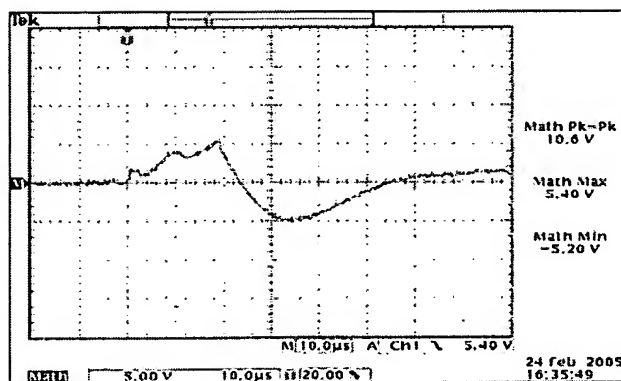


Figure 7: ESP Digital QC Line/Neutral Let-through

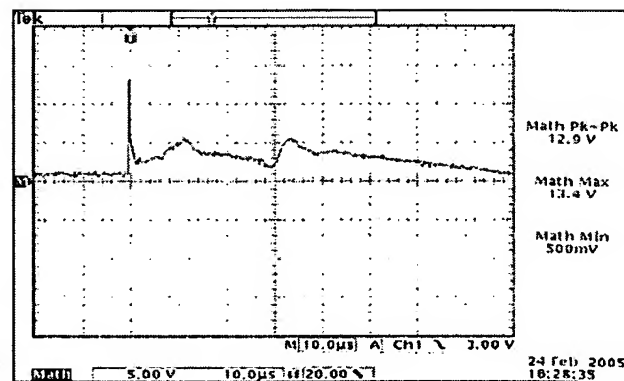


Figure 8: ESP Digital QC Neutral/Ground Let-through

Oneac — FilterOne

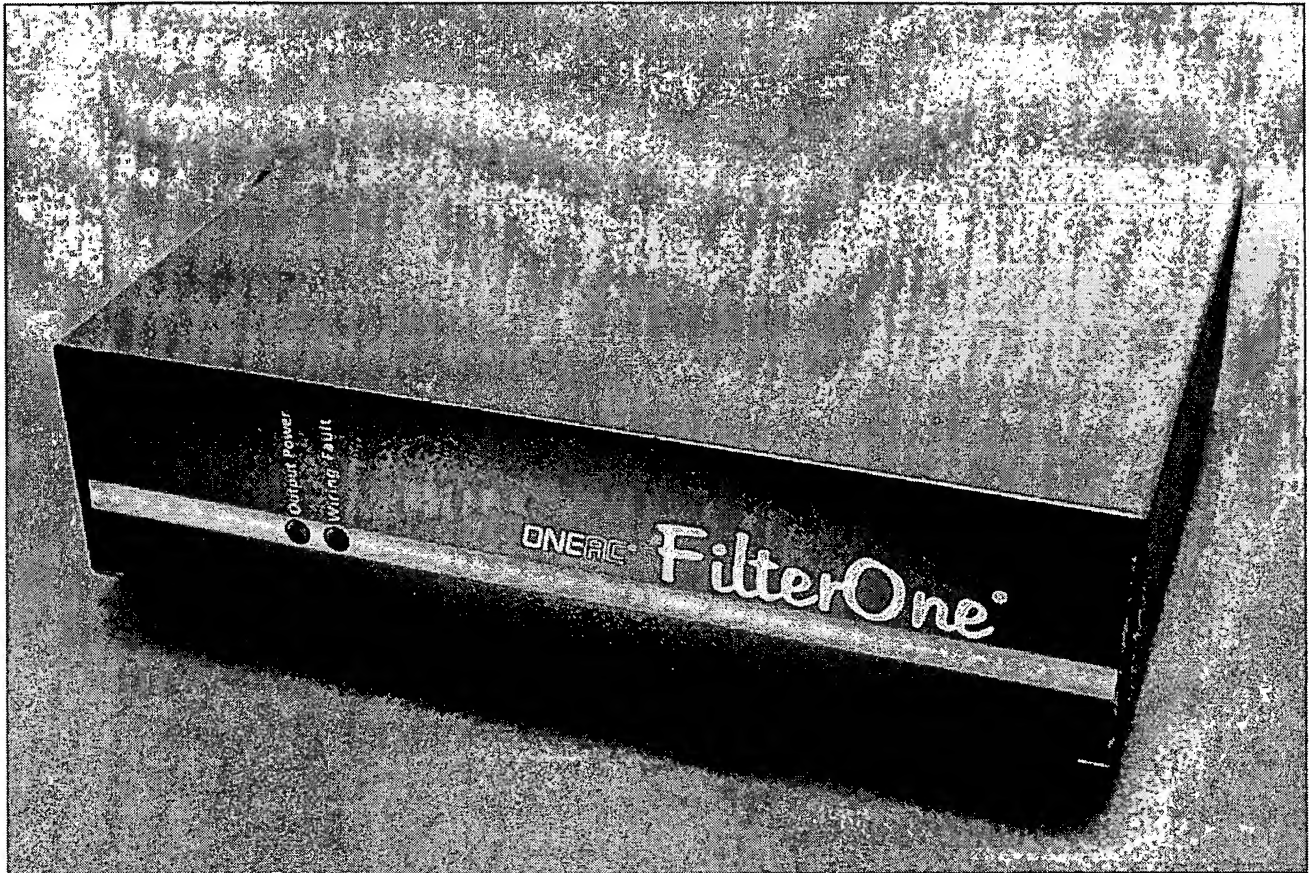


Photo 5 – Oneac FilterOne.

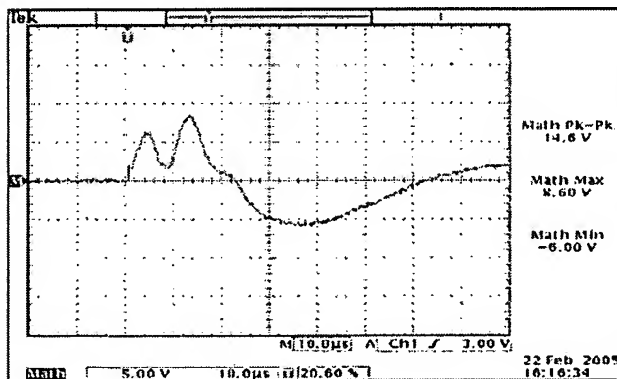


Figure 9: Oneac FilterOne Line/Neutral Let-through

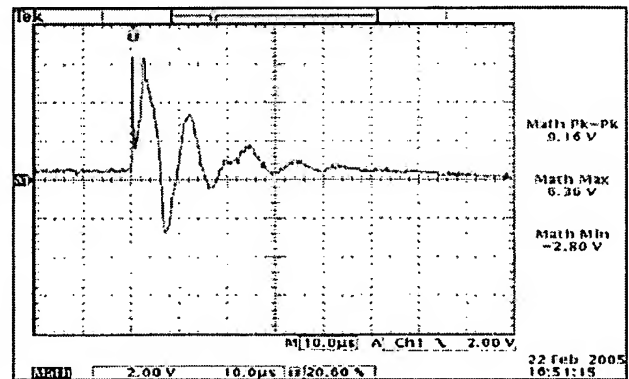


Figure 10: Oneac FilterOne Neutral/Ground Let-through

Over-Voltage Tests

Background

The power conditioning and filter/TVSS products were tested with momentary over-voltage. A Power Science line disturbance simulator generated three second over-voltage events. A Dranetz 658 power monitor recorded the voltage at the input and output of various power protection devices.

Products included in the testing are:

- Smart Power Ñ Digital Smart TBF Ñ Copier Guardian
- EFI Ñ Transient Voltage Surge Suppressor (TVSS)
- Panamax Ñ MAX ImagePro 15 Amp
- ESP Ñ Digital QC
- Oneac Ñ FilterOne

Monitor Setup

- ChA = voltage input to protection device
- ChB = voltage output from protection device

Test results

- Smart Power ð Digital Smart TBF ð Copier Guardian: Removes over-voltage condition from output 100mS after voltage reaches high limits and returns voltage automatically when voltage returns to normal levels.
- Panamax: Removes over-voltage condition from output 50mS after voltage reaches high limits and returns voltage automatically when voltage returns to normal levels.
- EFI TVSS: Passes over-voltage event through to output. ^[1]
- Digital QC: Passes over-voltage event through to output. ^[1]
- Oneac Ñ FilterOne: Passes over-voltage event through to output. ^[1]

^[1] Sustained over-voltage conditions can cause failure of components in the protection device as well as the connected load.

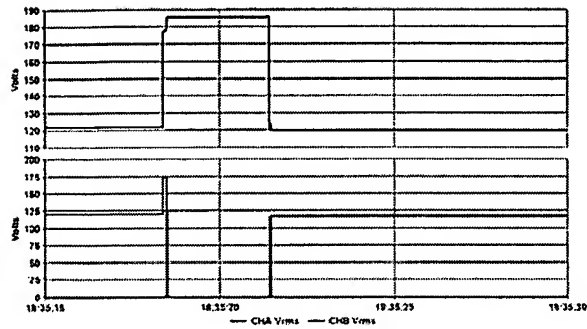


Figure 11: Smart Power Copier Guardian over-voltage test

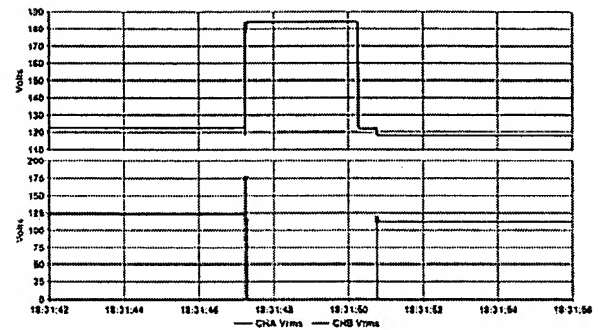


Figure 12: Panamax Max Image Pro over-voltage test

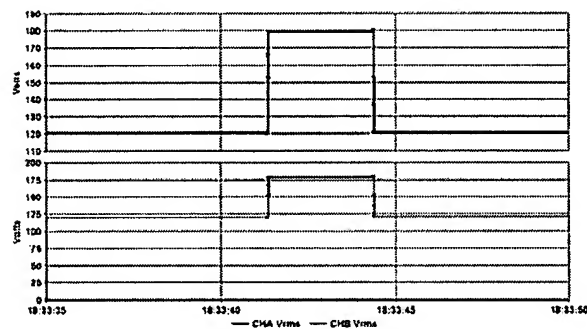


Figure 13: EFI TVSS over-voltage test

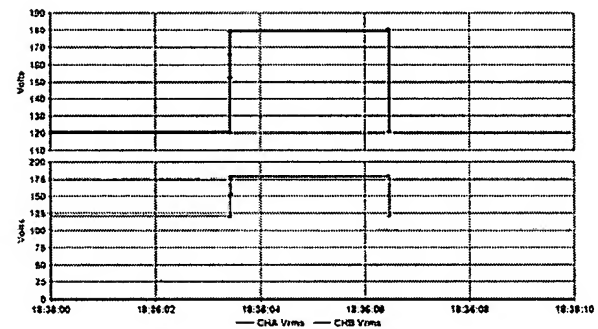


Figure 14: ESP Digital QC over-voltage test

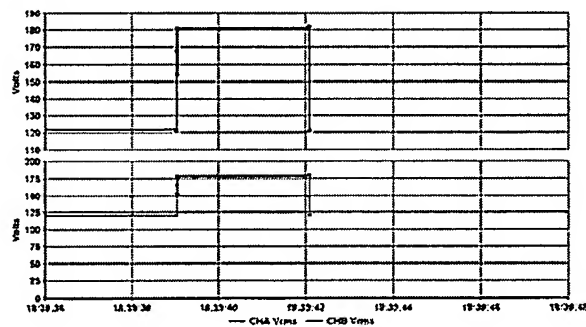


Figure 15: Oneac FilterOne over-voltage test

Wiring Fault Tests

Background

The various power conditioning and filter/TVSS products were tested with two types of wiring problems commonly found in residential and commercial facilities: Open ground and line/neutral reversal. Ideally, a protection device should disable the output if severe wiring problems are present.

Products included in the testing are:

- Smart Power Ñ Digital Smart TBF Ñ Copier Guardian
- EFI Ñ Transient Voltage Surge Suppressor (TVSS)
- Panamax Power Filter Ñ MAX ImagePro 15 Amp
- ESP Power Filter Ñ Digital QC
- Oneac Power Filter Ñ FilterOne

Table 2 - Wiring fault tests

Wiring Problem: Open Ground		
	Indicator Status	Output
Smart Power Copier Guardian	Red light	Disabled
EFI TVSS	Green light	Voltage Present
Panamax Max Image Pro	Red lights ðline fault unsafe power	Disabled
ESP Digital QC	No light	Voltage Present
Oneac FilterOne	Red light ðwiring fault	Voltage Present
Wiring Problem: Line/neutral Reversed		
Smart Power Copier Guardian	Red light	Disabled
EFI TVSS	Green light	Voltage Present
Panamax Max Image Pro	Red lights ðline fault unsafe power	Disabled
ESP Digital QC	No light	Voltage Present
Oneac FilterOne	Red light ðwiring fault	Voltage Present

Week 8 - 2003
(February / 2003)

0308

60

MODEL: D5130NT

S/N 622787 0308

VOLTAGE 120 FREQ. 60 HZ

AMPS 15 WATTS 1800



ESPD

MADE IN THE USA

ELECTRONIC SYSTEMS PROTECTION

www.realpowerprotection.com 800-645-9721

TRANSIENT VOLTAGE SURGE SUPPRESSOR

SUPPRESSED VOLTAGE RATING: 330V ALL MODES



LISTED 73Z3

WARNING: NOT FOR HOUSEHOLD USE. EARTH
GROUNDING TERMINAL IS INTENDED TO
PROVIDE PROTECTION FROM ELECTRIC SHOCK.
PLUG INTO PROPERLY WIRED OUTLET.
TO REDUCE THE RISK OF ELECTRIC SHOCK
USE ONLY INDOORS

Not intended for use with GFCI circuits

Week 18 - 2003
(May / 2003)



VERAC® CORPORATION
LIBERTYVILLE, IL 60048

FS11015A

P/N 611015A-S1SB

S/N 0318-1099

INPUT 120 V ~ 15 A

MAXIMUM TOTAL OUTPUT

120 V ~ 15 A

60 HZ 1 PHASE

SVR (ALL MODES) 330 V

WARNING: Plug into Properly
Wired Grounding Type Outlet to
Provide Protection from Electric Shock.
Intended for Indoor Industrial and
Commercial Use Only.



TVSS
EMI FILTER
4VA4



MADE IN U.S.A.

541-317



MODEL: DPF12015NR

Transient Voltage Surge Suppressor

120 VAC, 50/60 Hz, 15 AMPS

U.L. 1449 Rating: 330V L-N, 330V L-G, 330V N-G

DC Breakdown Rating: 330 Vdc



UL LISTED
6MT3

LED Diagnostics: Green - Power On, Protection Working

WARNING: Not for household use. Earth-grounding terminal is intended to provide protection from electric shock. Plug into a properly grounding type outlet. To reduce the risk of electric shock, use only indoors.

27-Aug-02

WCW:ST01A

8245-0074A

DPF12015NR
CT135898

8245-0077A

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27-Aug-02

WCW:ST01A

8245-0074A